Working Session: Software Architecture Competence

Software Engineering Institute Carnegie Mellon University Pittsburgh, PA 15213

Paul Clements 15 May 2007

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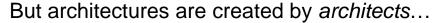
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Improving Software Architecture Competence

Most of the work in architecture to date has been technical

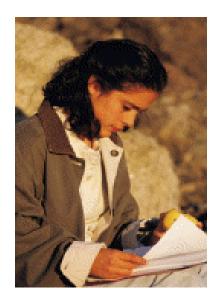
- Design and creation
- Evaluation and analysis of architectures
- Styles and patterns
- Architectural reuse and software product lines
- Architectures for particular domains
- Architectural re-engineering and recovery



- How can we help them do their best work?
- What does it mean for an architect to be competent?
- How can an architect improve his/her competence?

...working in organizations.

- How can we help an organization help their architects do their best work?
- What does it mean for an organization that produces architectures to be competent?
- · How can an organization improve its competence in architecture?



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Opening discussion questions - 1

- 1. Can you given an exemplary example of competence, or a pathological example of competence? How would you have measured or predicted these?
 - Architect needs to understand roles, understand the scope of work. Ultimately, they
 need to understand the organization.
 - Be a good communicator. Frequency of communication is a measure.
 - Experience and knowledge in the domain, having built similar systems.
 - Embracing the most recent innovations in the field is not necessarily a good thing.
 - The architect should be aware of the skill set available in the team.
 - Specialized skills (e.g., security, performance).
 - What processes has the architect used? What was his role then?
 - Is the architect able to answer the hard questions about the design? Did the code ended up like the original architecture?
 - If the architecture withstood the test of time, it's a sign that the architect did a good job. If the architecture did not withstand the test of time, we can't hold it against the architect because other factors may have affected the end result.
 - There's the competence on the acquirers side and the providers side.

Opening discussion questions - 2

2. What do you think is the value of architecture to an organization? For each, how might you measure the value?

- Decrease the amount of verification and validation of the product. The organization wants to move the cost of V&V on the product to the V&V of the architecture.
- Is there recognition of the architect in the organization? Definition of the role 'architect'?
- Are there groups within the organization where architects can share experiences?
- Having dedicated architects is a function of the size of the company.
- Does the software process in use prescribe architecture-related activities (e.g., producing a SAD)? Are there standard architecture artifacts as outputs?
- Are there experts in different quality attributes available to help in the software architecture of the systems.
- How does the organization staff development teams?
- Pathological: some organizations don't do better in architecture saying they don't have time/money for that and already know what to do.
- Can the managers speak the language of architecture?

Other questions

How can we convince an organization that architecture is important?

- It's difficult. You have to engage technical people that have a say within top management. These champions of architecture work need to be able to describe the benefits and artifacts that architecture-centric work would generate.
- Sacrifice training budget to send management to SEI or Zachman courses
- Training can be informal like brown bag lunches.
- You can incentivize people to create good architectures.
- You can incentivize developers not to ignore the architecture.
- You can create career path for architects.
- You can certificate architects.
- Organizations that do these things are more architecturally competent.
- To stimulate people to participate in QAW, we tell them it's their interest to be there.

Other questions

How can we convince a manager that architecture is important?

- Discuss the impact of not finding problems early in the design phase.
- If the customers ask for it, manager will do it.
- If we can tell managers how much money will be saved with architecture, they will buy it.

How can we measure the ROI of architecture?

 Tell executive that the way business is done can change dramatically in a short period of time and architecture is a mechanism for gaining control of these changes.

Possible value of architecture

Predictability in cost and schedule and quality

- Measure: Variance between predictions and actual
- Hypothesis: Architecture practices lead to lower variances

Ability to achieve system that meets its requirements (which presumably reflect business goals)

- Measure: Does it or doesn't it? What percentage of requirements are met?
 What percentage of high-priority requirements are met?
- Hypothesis: Architecture practices lead to higher achievement

Architectural duties: How can we measure value?

 Overall 		
 Creating the architecture 		
 Architecture evaluation and analysis 		
 Documentation 		
 Existing system and transformation 		
Requirements		
 Testing 		
 Coding and development 		
Future technologies		
 Tools and technology selection 		
 Overall 		
 Clients 		
Developers		
Ducing the second second		
 Project management 		
Project managementPeople management		
People management		
People managementSupport for project management		
People managementSupport for project managementOrganization		